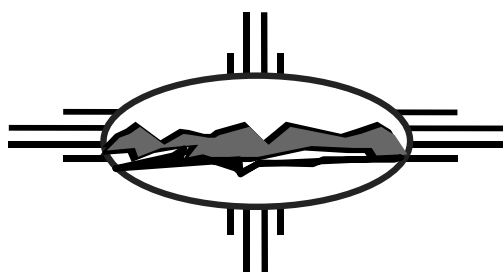


STANDARD OPERATING PROCEDURE

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Transportation, Receipt, and Admittance of Borehole Samples for the Sample Management Facility	ER-SOP-12.02	3	8/26/98



ER PROJECT

APPROVALS FOR USE

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LOS ALAMOS NATIONAL LABORATORY

TRANSPORTATION, RECEIPT, AND ADMITTANCE OF BOREHOLE SAMPLES FOR THE SAMPLE MANAGEMENT FACILITY

Table of Contents

1.0 PURPOSE	3
2.0 TRAINING	3
3.0 DEFINITIONS.....	3
4.0 BACKGROUND AND PRECAUTIONS.....	4
5.0 EQUIPMENT	5
6.0 PROCEDURE.....	5
7.0 REFERENCES	12
8.0 RECORDS.....	12
9.0 ATTACHMENTS.....	12

TRANSPORTATION, RECEIPT, AND ADMITTANCE OF BOREHOLE SAMPLES FOR THE SAMPLE MANAGEMENT FACILITY

NOTE: ER Project personnel may produce copies of this procedure from the controlled document electronic file. However, it is the user's responsibility to assure that they are trained to and utilizing the current version of this procedure. The procedure author may be contacted if changes are unclear.

1.0 PURPOSE

The purpose of this procedure is to facilitate the transport, handling, tracking, documentation, and admittance of borehole samples after their shipment from the drill site and their subsequent arrival at the Environmental Restoration (ER) Project Sample Management Facility (SMF).

2.0 TRAINING

- 2.1 All users of this SOP are trained by self-study, and the training is documented in accordance with QP-2.2, Personnel Orientation and Training.
- 2.2 The **Field Team Leader** (FTL) will monitor the proper implementation of this procedure and ensure that relevant team members have completed all training assignments (see Section 7.0) in accordance with QP-2.2, Personnel Orientation and Training.

3.0 DEFINITIONS

- 3.1 **Core** - A core is a cylindrical section of rock, or fragment thereof, that is taken as a sample of the interval penetrated by a core bit and that is brought to the surface for examination and/or analysis.
- 3.2 **Cuttings** - Cuttings are chips of rock produced during drilling that are removed from the borehole by circulation of drilling fluids (gas, foam, or liquid).
- 3.3 **Field Support Facility** - The Field Support Facility (FSF) is Building TA-3-271 and houses both the Sample Management Facility (SMF) and the Sample Management Organization (SMO). The SMF manages borehole samples and the SMO manages analytical samples.
- 3.4 **Information Block** - An information block is an object placed in a sample container. The block represents a depth interval and provides information pertaining to the status of that interval.

- 3.5 **Rubble** - Rubble consists of fragments of core from a single interval, the individual diameters of which average less than one half the diameter of the whole core.
- 3.6 **Sample** - A sample is a physical entity, representative of the whole, that is collected or generated for data, analysis, or testing.
- 3.7 **Sample Management Facility** - The SMF is one of the organizations housed in the FSF and is used for the documentation, examination, physical processing, storage, and control of selected samples, remnants, and records collected and distributed for the ER Project. The SMF consists of a physical facility and equipment designed to effectively process and preserve these samples, remnants, and records.
- 3.8 **Sample Type** - Sample type designates the type of material that makes up a sample, i.e., core or cuttings.
- 3.9 **Specimen** - A specimen is a subsection or portion that has been removed from a sample or remnant that undergoes testing, analysis, or other technical or scientific evaluation and is tracked individually. It may also be referred to as an analytical sample.
- 3.10 **Unique Identifier** - A unique identifier (ID) is a designation that sets a documentable object or event apart from similar entities. It may be an assigned number, a name, and alphanumeric designation, or a set of data items that collectively serve to specify an entity. Examples of unique identifiers used in this procedure include Borehole ID, Container ID, Sample ID, or Specimen ID.

4.0 BACKGROUND AND PRECAUTIONS

- 4.1 This procedure is limited to the activities necessary to transport borehole samples from FU drill sites to the SMF where they are received, have their identity confirmed, and admitted. The category of borehole samples controlled by this procedure are primarily collected for geologic and hydrologic characterization. This procedure does not address the transport of samples collected exclusively for field monitoring or laboratory analysis for hazardous wastes or radiation levels.
- 4.2 All borehole samples submitted to the ER Project SMF must be accompanied by a certification stating that the samples have undergone field or laboratory screening for radiological and chemical contamination. This certification shall state that levels of radiological and chemical contaminants of the samples are within SMF health and safety based acceptance criteria.

- 4.3 SMF personnel may perform additional screening at their discretion at any point during the admittance process.

5.0 EQUIPMENT

Equipment necessary for this procedure will include, but is not limited to:

- Transport vehicle
- Core marking supplies
- Measuring rulers marked in tenths of a foot
- Field screening equipment

6.0 PROCEDURE

Note: Deviations to SOPs are made in accordance with section 4.9 of ER-QP-4.2, Standard Operating Procedures Development.

6.1 Introduction

Borehole samples collected and temporarily stored in sample storage trailers at FU drill sites will be transferred to the SMF for processing and storage. This procedure describes the methods necessary to ensure that samples are correctly packaged, shipped, and documented so that the samples, containers, and associated records arrive at the SMF in acceptable condition, available for processing, examination, and storage.

This procedure is also designed to minimize the occurrence of discrepancies and errors and to correct these errors before they become part of the permanent record. These errors may include; clerical and handling discrepancies occurring during transport preparation; unsuitable packaging of samples; improper or missing documentation or improper annotation of samples or containers; or errors associated with processing and storage at the SMF.

6.2 Preparation of Samples and Documentation for Transmittal

6.2.1 Before shipping a group of borehole sample containers from the drill site to the SMF, the SMF Field Operations Staff will generate a Field Container Summary and Transmittal Form (Attachment A). The Transmittal Form must contain the following information:

- a. Borehole ID
- b. Number of containers included in the shipment

- c. Date of the shipment
- d. A list of the containers included in the shipment, containing the following information for each:
 - Container ID
 - Sample type (core, cuttings, or other sample)
 - Sequential container number with respect to other containers from the same borehole of the same sample type
 - Depth interval (of container)

NOTE: Field personnel maintaining custody of the samples may omit step "e" if equivalent sample interval and existence code information is submitted to the SMF.

- e. For each container, a list of all included depth intervals and their existence codes

NOTE: Existence codes may include the following:

- **REC** - A sample recovered from the borehole and included within the container
 - **UNREC** - An interval for which no samples were successfully recovered
 - **NAT** - A drilled interval during which no sample recovery was attempted
 - **WCR** - A field whole core sample (analytical sample) removed from the core before the boxing of the container interval, in accordance with LANL-ER-SOP-12.01
 - **LOST** - A sample that was recovered, but is unaccounted for during container loading
 - **DEST** - A sample accidentally destroyed before loading into its container
- f. A description of the documentation supplied with the sample shipment

NOTE: The cumulative sample shipments for each borehole shall include the following:

- Field Photographic Log
- Field Video Log
- Daily Drilling Summary
- Field Analytical Sample Removal Checklist (Removal Checklist)
- Core Sample Log
- Field Bit Cuttings Log
- Core Videotape
- Certification of Screening Levels

6.2.2 The field personnel maintaining custody of the samples will ensure that the field and/or laboratory screening has been completed for radioactive and non-radioactive contaminant levels. Documentation stating that levels of radiological and non-radiological contaminants of the samples are within SMF health and safety based Acceptance Criteria (see Table 1) will be signed by the on-site monitoring personnel. Only samples that have been certified to be within acceptable levels will be transported to the SMF.

TABLE 1

SMF Acceptance Criteria

Hazard	Acceptance Level	Method
Penetrating Radiation*	<100, 000 dpm/100 cm ² at a distance of 1 inch from the sample material	gross beta/gamma
Radon	<3.8 pCi/L	portable radon detector

Tritium	<220, 000 pCi/L	portable tritium monitor, or liquid scintillation counting for samples taken from tritium contaminated areas.
Beta/Gamma Contaminated Particulates*	<100, 000 dpm/100 cm ²	various methods, including direct reading instruments, swipes, and smears
Alpha Contaminated Particulates*	<1000 dpm/100 cm ²	various methods, including direct reading instruments, swipes, and smears
Volatile Organic Compounds*	<5.9 ppm total VOC	PID ¹ , FID ² , colorimetric indicator tubes
Metals	acceptable exposure limits ³	EPA method SW 6010

1 Photo ionization Detector

2 Flame ionization Detector

3 Acceptable level (ppm) = species specific occupational exposure limit (mg/m³) /10 (mg/m³)

* Hazards suitable for detection with field screening instruments.

6.2.3 The certification will provide field readings for beta/gamma, alpha, and volatile organic compounds. Laboratory results of those hazards that can not effectively be analyzed in the field (i.e., tritium, metals, etc.) will also be certified and provided to the SMF. Samples may be accepted for curation by the SMF if the sample's readings are below the Acceptance Criteria upper limits. Samples will not be accepted for curation if readings are above the Acceptance Criteria Limits.

6.2.4 This certification of screening levels will also establish that the samples may be shipped to the SMF in accordance with Department of Transportation regulations.

6.2.5 SMF staff will provide a vehicle for transport of borehole samples from the field to the SMF.

6.2.6 Containers will be loaded to ensure against displacement.

6.2.7 The field staff will inventory the containers and documents being loaded into the transport vehicle and check them against the

Transmittal Form. When the data agrees with the contents of the vehicle, the staff taking the samples from the site will sign the “Person Accepting Custody” field, and place the date and time of the transfer in the space provided.

- 6.2.8 The field staff will inventory each container and document being loaded into the transport vehicle and check them against the Transmittal Form. They will mark the “Shipped OK” space for each container properly loaded.

6.3 Transport and Receipt of Samples and Documents

- 6.3.1 The courier will then transport the containers and documents to the SMF. Upon arrival the containers and documentation the courier will remove containers and documents from the vehicle and place them in an available receiving area.
- 6.3.2 An SMF Geotechnician will inventory containers and documents being unloaded from the transport vehicle and check them against the Transmittal Form. The Geotechnician will mark the “Received OK” space for each container properly unloaded.
- 6.3.3 When the data on the Transmittal Form agrees with the contents of the vehicle, the Geotechnician will sign the “Person Accepting Custody” field and place the date and time of transfer in the space provided.
- 6.3.4 The courier will inventory containers and documents being unloaded from the transport vehicle and check them against the Transmittal Form. When the data on the Transmittal Form agree with the contents of the vehicle, the courier will sign the “Person Releasing Custody” field and place the date and time of the transfer in the spaces provided.

6.4 Assessment of Screening

- 6.4.1 Periodic resurveying of incoming sample materials will be performed. The frequency is dependent upon historical site information, field monitoring results, and analytical laboratory results. This determination will serve as a quality control check to ensure that no sample material exceeding health and safety based acceptance criteria are admitted for curation.
- 6.4.2 The SMF Curator will designate specific sample containers to be resurveyed based upon evaluation of the potential contaminants of concern (PCOCs) as listed in the relevant Resource Conservation

and Recovery Act Facility Investigation (RFI) Work Plan, field monitoring results, and laboratory analytical data (if any).

- 6.4.3 Sample materials will be monitored for hazards such as penetrating radiation, volatile organic compounds, and tritium. Techniques for sample material monitoring will be carried out in compliance with the latest revision of: 1) LANL Radiological Control Manual (for radiation), and 2) LANL Environmental, Safety, and Health Manual - Administrative Requirement 6-2 (for volatile organic compounds).
- 6.4.4 The results of any sample material hazard survey conducted at the SMF will be documented on the "Confirmation Checklist" in the space provided for comments in addition to applicable records requirements described in the LANL Radiological Control Manual - Chapter 7, or LANL Environmental, Safety, and Health Manual.

6.5 Admittance of Samples and Documents to the SMF

- 6.5.1 The SMF Curator will assign a group of one or more available containers to undergo the admittance portion of this procedure.
- 6.5.2 SMF staff will arrange containers in a work area in preparation for admittance. The SMF staff will open the lids of the containers and inspect the contents for signs of damage or disruption that may have been sustained during transport.
- 6.5.3 SMF staff will generate a Confirmation Checklist using data from the Transmittal Form and the Removal Checklist, containing as a minimum the following items:
 - a. A list of containers included in the assignment with the following data for each:
 - Container ID
 - Borehole ID
 - Sequential container number
 - Sample type (core, cuttings, or other sample)
 - b. For each container, a list of all included sample intervals, and their existence codes.
 - c. Date the Confirmation Checklist was prepared

- d. For each interval, spaces for notations, corrections, and comments regarding status of samples, and a verification line for the SMF Geotechnician to initial after confirmation of sample data.
- e. Signature lines for the SMF Geotechnician and Curator to document the completion of the Confirmation Checklist
- f. A page mark indicating the total number of pages in the Confirmation Checklist, and the sequence of the individual page.

6.5.4 The SMF Geotechnician will compare the information contained in the Confirmation Checklist with the contents of the containers, checking for the following conditions:

- a. Container IDs should match those on container labels.
- b. Existence codes should match the samples or information blocks within the indicated container.
- c. All field core analytical samples documented on the information blocks in containers should have been recorded on the Removal Checklist.
- d. All depths marked on samples should be consistent with those recorded on the container labels and with the intervals given on the Confirmation Checklist.

6.5.5 The SMF Geotechnician will initial each sample interval in the space provided when the information is confirmed or corrected.

6.5.6 The SMF Geotechnician will sign and date each page of the completed Confirmation Checklist in the spaces provided and submit it to the Curator. The SMF Geotechnician will also submit the Transmittal Form and the Removal Checklist to the Curator or designee.

6.5.7 The SMF Geotechnician will file remaining documents received in the borehole documents file.

6.5.8 The Curator or designee verifies that the Confirmation Checklist, Removal Checklist, and Transmittal Form are completely and correctly filled out. The Curator or designee will sign and date each page in the spaces provided.

6.5.9 The SMF Geotechnician will photocopy, compile, and submit records generated or received under this procedure to the SMF Administrative Secretary for processing.

6.5.10 Upon the completion of the admittance process containers of samples will be stored under chain of custody control at the SMF until processing or examination is necessary.

7.0 REFERENCES

ER-QMP, Quality Management Plan for the Los Alamos National Laboratory

Environmental Restoration Project

LANL-ER-SOP-1.01, General Instructions for Field Investigations

LANL-ER-SOP-1.02, Sample Containers and Preservation

LANL-ER-SOP-1.03, Handling, Packaging, and Shipping of Samples

LANL-ER-SOP-1.04, Sample Control and Field Documentation

LANL-ER-SOP-4.01, Drilling Methods and Drill Site Management

LANL-ER-SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials

QP-4.3, Records Management

QP-2.2, Personnel Orientation and Training

"Branch Technical Procedure: Transport, Receipt, Admittance, and Processing of Borehole Samples for the SMF," 1989, Yucca Mountain Project Office, Las Vegas, NV

8.0 RECORDS

The **SMF Administrative Secretary** submits the following records to the Records Processing Facility in accordance with QP-4.3, Records Management.

8.1 Field Container Summary and Transmittal Form

8.2 Confirmation Checklist

9.0 ATTACHMENTS

Attachment A — Field Container Summary and Transmittal Form (1 page)

Attachment B — Transmittal Form (1 page)

Attachment C — Database Generated Confirmation Checklist (1 page)

FIELD CONTAINER SUMMARY AND TRANSMITTAL FORM

Sample Management Facility

Borehole ID:

Sample Container Total:

Page __ of __

Existence Codes:

REC - A sample removed from the borehole and included within the container.

UNREC - An interval for which no samples were successfully recovered.

NAT - A drilled interval during which no sample recovery was attempted.

SPC-FLD - A field specimen (analytical sample) removed from the core before the boxing of the container interval.

LOST - A sample that was recovered but is unaccounted for during container loading.

DEST - A sample accidentally destroyed before loading into its container.

DOCUMENTATION:

ARRIVED AT SMF

FIELD SITE TO TRANSPORT

TRANSPORT TO SMF

Person Accepting Custody:

Print Name/Signature

Date/Time

Person Accepting Custody:

Print Name/Signature

Date/Time

Person Releasing Custody:

Print Name/Signature

Date/Time

Person Releasing Custody:

Print Name/Signature

Date/Time

Box Interval

Sequential

Sample Type

Shipped OK

Received OK

Sample Intervals

FCT Number

Top

Bottom

Box Number

Top Bottom Existence

For SMF Use:

Checked By: _____

Print Name/Signature

Date

SOP-12.02, R3

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Project

FIELD CONTAINER SUMMARY AND TRANSMITTAL FORM									
Sample Management Facility									
FIELD SITE TO TRANSPORT					TRANSPORT TO SMF				
<i>Person Releasing Custody:</i> _____					<i>Person Releasing Custody:</i> _____ Print Name/Signature Date/time				
<i>Person Accepting Custody:</i> _____ Print Name/Signature Date/Time					<i>Person Accepting Custody:</i> _____ Print Name/Signature Date/Time				
<i>Checked By:</i> _____ Print Name/Signature Date/Time					Borehole ID: TA/OU: Shipment Container Total:				
DOCUMENTATION								RECEIVED AT SMF	
Sample Type	FCT Bar Code Number	Existence Code	Container or Sample Interval	Received 4	Sample Type	FCT Bar Code Number	Existence Code	Container or Sample Interval	Received 4
Sample Existence Codes: <i>REC</i> – Recovered <i>UNREC</i> – Unrecovered <i>NAT</i> – Not Attempted <i>WCR</i> – Whole Core Removed <i>LOST</i> – Lost <i>DEST</i> - Destroyed									
SOP-12.02, R3								Los Alamos Environmental Restoration Project	

Sample Management Facility